



## General

### Guideline Title

Emergency nursing resource: non-invasive temperature measurement in the emergency department.

### Bibliographic Source(s)

ENA Emergency Nursing Resources Development Committee. Emergency nursing resource: non-invasive temperature measurement in the emergency department. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 14 p. [36 references]

### Guideline Status

This is the current release of the guideline.

## Recommendations

### Major Recommendations

The grades of recommendations (A–C, Not Recommended), levels of evidence (I–VII), and quality of evidence (I–IV) are defined at the end of the "Major Recommendations" field.

Description of Decision Options/Interventions and the Level of Recommendation

Temperature Measurement Device	Adult	Adult Febrile	Adult Hypothermic	Adult Critically Ill/Intubated	Pediatric 0-3 Months	Pediatric 3 Months-3 Years	Pediatric 3 Years-18 Years	Pediatric Febrile	Pediatric Hypothermic	Pediatric Critically Ill/Intubated
Oral	A	A	A	A	N/R	A	A	A	N/E	N/R
Tympanic	I/E	N/R	N/E	I/E	N/R	I/E	N/R	N/R	N/E	I/E
Temporal Artery	A	N/R	N/E	I/E	N/R	I/E	A	A*	N/E	I/E
Chemical Dot	I/E	I/E	N/E	I/E	N/R	N/E	N/R	N/R	N/E	N/E
Axillary	B	N/R	N/E	I/E	N/R	I/E	B	N/R	N/E	I/E

\*Temporal artery temperature greater than 37.3°C indicates rectal temperature of 38.3°C or greater in subjects 3-24 months (Schuh et al., 2004).

Level A (High) Recommendation: Based on consistent and good quality of evidence; has relevance and applicability to emergency nursing practice.

Level B (Moderate) Recommendation: There are some minor inconsistencies in quality evidence; has relevance and applicability to emergency nursing practice.

Level C (Weak) Recommendation: There is limited or low-quality patient-oriented evidence; has relevance and applicability to emergency nursing practice.

N/R: Not recommended based upon current evidence.

I/E: Insufficient evidence upon which to make a recommendation.

N/E: No evidence upon which to make a recommendation.

#### Definitions:

#### Levels of Recommendation for Practice

##### Level A Recommendations: High

- Reflects a high degree of clinical certainty
- Based on availability of high quality Level I, II and/or III evidence available using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field)
- Based on consistent and good quality evidence; has relevance and applicability to emergency nursing practice
- Is beneficial

##### Level B Recommendations: Moderate

- Reflects moderate clinical certainty
- Based on availability of Level III and/or Level IV and V evidence using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field)
- There are some minor flaws or inconsistencies in quality of evidence; has relevance and applicability to emergency nursing practice
- Is likely to be beneficial

##### Level C Recommendations: Weak

- Level V, VI and/or VII evidence available using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field) - Based on consensus, usual practice, evidence, case series for studies of treatment or screening, anecdotal evidence, and/or opinion
- There is limited or low quality patient-oriented evidence; has relevance and applicability to emergency nursing practice
- Has limited or unknown effectiveness

##### Not Recommended for Practice

- No objective evidence or only anecdotal evidence available; or the supportive evidence is from poorly controlled or uncontrolled studies
- Other indications for not recommending evidence for practice may include:
  - Conflicting evidence
  - Harmfulness has been demonstrated
  - Cost or burden necessary for intervention exceeds anticipated benefit
  - Does not have relevance or applicability to emergency nursing practice
- There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. For example:
  - Heterogeneity of results
  - Uncertainty about effect magnitude and consequences
  - Strength of prior beliefs
  - Publication bias

---

## Grading the Levels of Evidence\*

- I. Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of RCTs
- II. Evidence obtained from at least one properly designed randomized controlled trial
- III. Evidence obtained from well-designed controlled trials without randomization
- IV. Evidence obtained from well-designed case control and cohort studies
- V. Evidence from systematic reviews of descriptive and qualitative studies
- VI. Evidence from a single descriptive or qualitative study
- VII. Evidence from opinion of authorities and/or reports of expert committees

## Grading the Quality of the Evidence

- I. Acceptable Quality: No concerns
- II. Limitations in Quality: Minor flaws or inconsistencies in the evidence
- III. Major Limitations in Quality: Many flaws and inconsistencies in the evidence
- IV. Not Acceptable: Major flaws in the evidence

\*Melnyk, B. M., & Fineout-Overholt, E. (2005). Evidence-based practice in nursing and healthcare: A guide to best practice. Philadelphia, PA: Lippincott, Williams, & Wilkins.

## Clinical Algorithm(s)

None provided

## Scope

## Disease/Condition(s)

Conditions that require non-invasive body temperature measurement including, fever (hyperthermia) and hypothermia

## Guideline Category

Management

Technology Assessment

## Clinical Specialty

Critical Care

Emergency Medicine

Nursing

Pediatrics

## Intended Users

Advanced Practice Nurses

Nurses

## Guideline Objective(s)

To evaluate what method of non-invasive body temperature measurement is the most accurate and precise for use in patients (newborn to adult) in the emergency department

## Target Population

Adult and pediatric patients in the emergency department

## Interventions and Practices Considered

Temperature measurement:

- Oral (recommended in some of the populations studied)
- Tympanic (not recommended or insufficient evidence to make a recommendation in the populations studied)
- Temporal artery (recommended in some of the populations studied)
- Chemical dot (not recommended or insufficient evidence to make a recommendation in the populations studied)
- Axillary (recommended in some of the populations studied)

## Major Outcomes Considered

- Accuracy, precision, and/or bias of temperature measurements
- Time taken to obtain temperature

## Methodology

### Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

### Description of Methods Used to Collect/Select the Evidence

Via a comprehensive literature search, all articles relevant to the topic were identified. The following databases were searched: PubMed, Google Scholar, MEDLINE, CINAHL, Cochrane - British Medical Journal, Agency for Healthcare Research and Quality (AHRQ; [www.ahrq.gov](http://www.ahrq.gov) ) , and the National Guideline Clearinghouse ([www.guideline.gov](http://www.guideline.gov) ). Searches were conducted using a variety of different search combinations with: "temperature", "measurement", "methods", "devices", "thermometry", "invasive", "non-invasive", "oral", "rectal", "tympanic", "temporal", "esophageal", "pulmonary artery", "core", "body", "emergency", "emergency department", "critical care", "adults", "pediatrics", "children", "infants" and "neonates". Initial searches were limited to English language articles from December 1980 to October 2011. In addition, the reference lists in the selected articles were hand searched for additional pertinent references. Research articles from emergency department (ED) settings, non-ED settings, position statements and guidelines from other sources were also reviewed.

Articles that met the following criteria were chosen to formulate the Emergency Nursing Resource (ENR): research studies, meta-analyses, systematic reviews, and existing guidelines relevant to body temperature measurement. Other types of articles were reviewed and included as additional information. Articles that did not include a comparison to core temperature measurements (including rectal temperature) and/or comparison to oral temperatures were not included in the evidence summary as there was no way to determine the accuracy, precision and/or bias of temperature measurements. All temperature measurement devices described in this review are currently commercially available.

## Number of Source Documents

28 documents were included in the evidence tables.

## Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

## Rating Scheme for the Strength of the Evidence

Grading the Levels of Evidence\*

- I. Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs) or evidence-based clinical practice guidelines based on systematic reviews of RCTs
- II. Evidence obtained from at least one properly designed randomized controlled trial
- III. Evidence obtained from well-designed controlled trials without randomization
- IV. Evidence obtained from well-designed case control and cohort studies
- V. Evidence from systematic reviews of descriptive and qualitative studies
- VI. Evidence from a single descriptive or qualitative study
- VII. Evidence from opinion of authorities and/or reports of expert committees

Grading the Quality of the Evidence

- I. Acceptable Quality: No concerns
- II. Limitations in Quality: Minor flaws or inconsistencies in the evidence
- III. Major Limitations in Quality: Many flaws and inconsistencies in the evidence
- IV. Not Acceptable: Major flaws in the evidence

\*Melnik, B. M., & Fineout-Overholt, E. (2005). Evidence-based practice in nursing and healthcare: A guide to best practice. Philadelphia, PA: Lippincott, Williams, & Wilkins.

## Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

## Description of the Methods Used to Analyze the Evidence

The Emergency Nursing Resource (ENR) authors used standardized worksheets, including the Reference Table, Evidence-Appraisal Table, Critique Worksheet and Appraisal of Guidelines Research and Evaluation (AGREE) Work Sheet (see the methodology companion in the "Availability of Companion Documents" field), to prepare tables of evidence ranking each article in terms of the level of evidence, quality of evidence, and relevance and applicability to practice. Clinical findings and levels of recommendations regarding patient management were then made by the Emergency Nursing Resource Development Committee according to the Emergency Nurses Association's (ENA's) classification of levels of recommendation for practice, which include: Level A High, Level B Moderate, Level C Weak or Not recommended for practice (see the "Rating Scheme for the Strength of the Recommendation" field).

## Methods Used to Formulate the Recommendations

Expert Consensus

## Description of Methods Used to Formulate the Recommendations

All members of the Subcommittee independently complete an exhaustive review of all identified literature, complete a separate evidence table for each topic (if possible), and then reconvene to reach consensus. Each Subcommittee prepares a description of the topic, definition, background, significance, and evidence table. The Subcommittee identifies and assigns preliminary scores for quality and strength of evidence, and describes conclusions based on the review of the body of evidence. The entire Committee reads the articles and reviews the evidence-appraisal tables for each topic and then finalizes implications for practice and the level of recommendation.

## Rating Scheme for the Strength of the Recommendations

### Levels of Recommendation for Practice

#### Level A Recommendations: High

- Reflects a high degree of clinical certainty
- Based on availability of high quality Level I, II and/or III evidence available using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field)
- Based on consistent and good quality evidence; has relevance and applicability to emergency nursing practice
- Is beneficial

#### Level B Recommendations: Moderate

- Reflects moderate clinical certainty
- Based on availability of Level III and/or Level IV and V evidence using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field)
- There are some minor flaws or inconsistencies in quality of evidence; has relevance and applicability to emergency nursing practice
- Is likely to be beneficial

#### Level C Recommendations: Weak

- Level V, VI and/or VII evidence available using Melnyk & Fineout-Overholt grading system\* (see the "Rating Scheme for the Strength of the Evidence" field) - Based on consensus, usual practice, evidence, case series for studies of treatment or screening, anecdotal evidence, and/or opinion
- There is limited or low quality patient-oriented evidence; has relevance and applicability to emergency nursing practice
- Has limited or unknown effectiveness

#### Not Recommended for Practice

- No objective evidence or only anecdotal evidence available; or the supportive evidence is from poorly controlled or uncontrolled studies
- Other indications for not recommending evidence for practice may include:
  - Conflicting evidence
  - Harmfulness has been demonstrated
  - Cost or burden necessary for intervention exceeds anticipated benefit
  - Does not have relevance or applicability to emergency nursing practice
- There are certain circumstances in which the recommendations stemming from a body of evidence should not be rated as highly as the individual studies on which they are based. For example:
  - Heterogeneity of results
  - Uncertainty about effect magnitude and consequences
  - Strength of prior beliefs
  - Publication bias

\*Melnik, B. M., & Fineout-Overholt, E. (2005). Evidence-based practice in nursing and healthcare: A guide to best practice. Philadelphia, PA: Lippincott, Williams, & Wilkins.

## Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

## Method of Guideline Validation

Internal Peer Review

## Description of Method of Guideline Validation

The Institute for Emergency Nursing Research (IENR) Advisory Council reviews the final document for overall validity and provides feedback as appropriate using the Emergency Nursing Resource (ENR) Evaluation Worksheet. Reviews and feedback are sent to the subgroup to evaluate and incorporate, as appropriate. Emergency Nurses Association (ENA) staff creates the final products for publication with input from the Committee.

## Evidence Supporting the Recommendations

### References Supporting the Recommendations

Schuh S, Komar L, Stephens D, Chu L, Read S, Allen U. Comparison of the temporal artery and rectal thermometry in children in the emergency department. *Pediatr Emerg Care*. 2004 Nov;20(11):736-41. [PubMed](#)

### Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is specifically stated for each recommendation (see the "Major Recommendations" field).

## Benefits/Harms of Implementing the Guideline Recommendations

### Potential Benefits

Appropriate non-invasive body temperature measurement for patients in the emergency department

### Potential Harms

Over- or undertreatment based on inaccurate temperature measurement

## Contraindications

### Contraindications

Rectal temperatures are contraindicated in neutropenic patients, and are not recommended in patients who have had rectal surgery/trauma or have diarrhea.

## Qualifying Statements

## Qualifying Statements

- The Emergency Nurses Association's (ENA's) Emergency Nursing Resources (ENRs) are developed by ENA members to provide emergency nurses with evidence-based information to utilize and implement in their care of emergency patients and families. Each ENR focuses on a clinical or practice-based issue, and is the result of a review and analysis of current information believed to be reliable. As such, information and recommendations within a particular ENR reflect the current scientific and clinical knowledge at the time of publication, are only current as of their publication date, and are subject to change without notice as advances emerge.
- In addition, variations in practice, which take into account the needs of the individual patient and the resources and limitations unique to the institution, may warrant approaches, treatments and/or procedures that differ from the recommendations outlined in the ENRs. Therefore, these recommendations should not be construed as dictating an exclusive course of management, treatment or care, nor does the use of such recommendations guarantee a particular outcome. ENRs are never intended to replace a practitioner's best judgment based on the clinical circumstances of a particular patient or patient population. ENRs are published by ENA for educational and informational purposes only, and ENA does not approve or endorse any specific methods, practices, or sources of information. ENA assumes no liability for any injury and/or damage to persons or property arising out of or related to the use of or reliance on any ENR.

## Implementation of the Guideline

### Description of Implementation Strategy

An implementation strategy was not provided.

### Implementation Tools

Quick Reference Guides/Physician Guides

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

## Institute of Medicine (IOM) National Healthcare Quality Report Categories

### IOM Care Need

Getting Better

### IOM Domain

Effectiveness

## Identifying Information and Availability

### Bibliographic Source(s)

ENA Emergency Nursing Resources Development Committee. Emergency nursing resource: non-invasive temperature measurement in the emergency department. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 14 p. [36 references]

### Adaptation

Not applicable: The guideline was not adapted from another source.



## Date Released

2011 Dec

## Guideline Developer(s)

Emergency Nurses Association - Professional Association

## Source(s) of Funding

Emergency Nurses Association

## Guideline Committee

2011 ENA Emergency Nursing Resources Development Committee

## Composition of Group That Authored the Guideline

*Committee Members:* Susan Barnason, PhD, RN, APRN, CEN, CCRN, CNS, CS; Jennifer Williams, MSN, RN, CEN, CCRN, CNS; Jean Proehl, MN, RN, CEN, CPEN, FAEN; Carla Brim, MN, RN, CEN, CNS; Melanie Crowley, MSN, RN, CEN, MICN; Sherry Leviner, MSN, RN, CEN; Cathleen Lindauer, MSN, RN, CEN; Mary Naccarato, MSN, RN, CEN, CCNS; Andrew Storer, DNP, RN, ACNP, CRNP, FNP

## Financial Disclosures/Conflicts of Interest

Not stated

## Guideline Status

This is the current release of the guideline.

## Guideline Availability

Electronic copies: Available in Portable Document Format (PDF) from the [Emergency Nurses Association Web site](#) .

## Availability of Companion Documents

The following are available:

- ENA Clinical Guidelines for Emergency Nursing Practice Committee. Guidelines for the development of clinical practice guidelines. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 30 p. Electronic copies: Available in Portable Document Format (PDF) from the [Emergency Nurses Association Web site](#) .
- Clinical practice guideline: non-invasive temperature measurement in the emergency department. Synopsis. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 1 p. Electronic copies: Available in PDF from the [Emergency Nurses Association Web site](#) .
- CPG evidence table: non-invasive temperature measurement in the emergency department. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 24 p. Electronic copies: Available in PDF from the [Emergency Nurses Association Web site](#) .
- CPG other resources table: non-invasive temperature measurement in the emergency department. Other resources table. Des Plaines (IL): Emergency Nurses Association; 2011 Dec. 1 p. Electronic copies: Available in PDF from the [Emergency Nurses Association Web site](#) .

## Patient Resources

None available

## NGC Status

This NGC summary was completed by ECRI Institute on July 2, 2012. The information was verified by the guideline developer on August 13, 2012.

## Copyright Statement

This summary is based on the original guideline, which is subject to the guideline developer's restrictions.

## Disclaimer

### NGC Disclaimer

The National Guideline Clearinghouse<sup>®</sup> (NGC) does not develop, produce, approve, or endorse the guidelines represented on this site.

All guidelines summarized by NGC and hosted on our site are produced under the auspices of medical specialty societies, relevant professional associations, public or private organizations, other government agencies, health care organizations or plans, and similar entities.

Guidelines represented on the NGC Web site are submitted by guideline developers, and are screened solely to determine that they meet the NGC Inclusion Criteria which may be found at <http://www.guideline.gov/about/inclusion-criteria.aspx>.

NGC, AHRQ, and its contractor ECRI Institute make no warranties concerning the content or clinical efficacy or effectiveness of the clinical practice guidelines and related materials represented on this site. Moreover, the views and opinions of developers or authors of guidelines represented on this site do not necessarily state or reflect those of NGC, AHRQ, or its contractor ECRI Institute, and inclusion or hosting of guidelines in NGC may not be used for advertising or commercial endorsement purposes.

Readers with questions regarding guideline content are directed to contact the guideline developer.